

Fast determination of TOC in seawater with the vario TOC cube

Task

The analysis of saline samples strongly reduce the lifetime of the quartz glass combustion tube and the catalyst of the vario TOC cube. Using a simple change in setup, by combining a low combustion temperature with a bottom closed ash finger containing quartz wool, saline samples can be analysed with the vario TOC cube without restrictions.

	Instrument	Sample
Basis:	vario TOC cube	Quantity: 0.2 ml
Mode:	TOC liquid	Consistency: liquid
Periphery:		Preparation: external acidification with HCl

Specification

The combustion tube temperature of the vario TOC is reduced to 680°C, so that the sample does not spatter when it enters the hot combustion tube. Moreover, a bottom closed ash finger containing ca. 1 cm quartz wool is used, in which all salt residues are captured.

Procedure

Various seawater samples with different salinity are analysed. The samples are acidified with HCl to a pH of 2 in order to outgas the TIC in the sample container and to only analyse the TOC fraction.

Sample	Salinity [%]	TOC [mg/l]	SD [mg/l]	RSD [%]
Atlantic Ocean	ca. 3.5	1.89	0.044	2.4
North Sea	ca. 3.5	6.78	0.073	1.1
Baltic Sea	ca. 0.8	4.63	0.148	3.1
Red Sea	ca. 4.0	2.64	0.046	1.7

Results

The relatively high TOC content in the samples indicate that they are taken close to the sea surface. The high relative standard deviation in the Atlantic Ocean and Baltic sea samples are caused by carbon containing particulates abundant in the samples.

By reducing the combustion tube temperature to 680°C and using a bottom closed ash finger containing quartz wool when analysing saline samples, the alkaline residues of the sample do not get in contact with the combustion tube and catalyst. Due to this complete matrix separation, the vario TOC cube can be run with saline samples automatically over a long time (more than 600 analyses on one combustion tube and ash finger).

The vario TOC cube is very well suited for the analysis of seawater samples. The low TOC content in seawater can be determined with a high precision.